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P R E F A C E.

THE Portrait of the late CHARLES Earl of LIVERPOOL, LL.D. from a drawing in the possession of the present Noble Earl his son, forms the Frontispiece to the 27th Volume of the Transactions of the Society, instituted at London for the Encouragement of Arts, Manufactures, and Commerce. The very great attention which his Lordship ever paid to the interests of the trade and commerce of this country, give him a peculiar claim to the respect of the Society, of which he was elected a Member in the year 1789, and one of their Vice-Presidents in 1791. His Lordship honoured the Society by an annual subscription of Five Guineas, and by a marked attention to their Communications on various points of commercial business. He died on the 17th of December, 1808, aged 81 years, having for a long period enjoyed the confidence of his present Majesty.

The Society have, with unremitting attention, during the last session, exerted themselves for the benefit of the public, and they trust that the present Volume will be found to contain a great variety of matter deserving public approbation. The Society are not ambitious of assuming the title of a literary or a scientific body, there being other Societies expressly

pressly instituted for such purposes, but they are anxious to be considered as the promoters and patrons of those useful Arts by which every class of mankind is benefited.

The present Volume commences, as usual, with Communications in the Class of Agriculture.

The great importance of Plantations throughout the waste lands of the united empire is now become so obvious as to require no arguments to enforce it. The effort of John Christian Curwen, Esq. of Workington, in this line, probably exceeds any attempt of a similar kind ever made by any one person in any country within the same period, he having planted within one year one million two hundred and sixty-nine thousand forest-trees. This exertion cannot fail strongly to impress upon the mind the benefits he has thus rendered to his country.

Much praise is due to Dr. William Thackeray, of Chester, for improving the estate of his stepson, a minor, by extensive plantations of ash, beech, chesnut, elm, and other trees; he has set an example well worthy of imitation by those gentlemen who are left the guardians and trustees of youth. And if any doubts should exist upon the real advantage of plantations on barren lands, a view of the forest-trees planted by Dr. Bain, at Heffleton, recorded in our last volume, would carry conviction to the mind.

William,

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William Congreve, Esq. of Aldermaston House, in Berkshire, hath sown and planted seventy-four acres of land with acorns and oaks. The growth of this valuable timber is an object of the first importance to the British Navy, that bulwark of our country and terror of our enemies.

No vegetable root is so useful a food for man or beast as the Potatoe ; but it is a lamentable fact, that either through fraud or indolence, or probably owing to both, this valuable product is greatly injured by the London practice of soaking them long in water under pretence of cleaning, by which a considerable increase in weight is made, by absorption of a quantity of the water, which is a gain to the seller, but renders them sodden and difficult of digestion. The Machine invented for washing them by Mr. William Lester, of Paddington, obviates all these inconveniencies, does the business with ease and dispatch, and leaves them ready for use in a clean and wholesome state.

It is well known that the natural products of Great Britain were formerly very few in comparison with those which have been subsequently introduced here from foreign countries. The difficulty of preserving trees and plants in a vegetating state, during long voyages, hath been a great impediment to improvements, or the general dissemination of vegetable products ; but this is now in a great measure removed by a discovery made by Mr. William Salisbury, of

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Brompton Botanic Garden, which consists in packing small plants or cuttings with alternate layers of that species of long moss, called the Sphagnum Palustre of Linnæus, which possesses a peculiar property of resisting putrefaction in both animal and vegetable substances.

Comparisons of the different modes by which useful animals are fed in various parts of the united empire, naturally lead to ascertain what articles can be cultivated by the farmer for such purposes with the greatest profit. The communication of the mode of cultivation of Parsnips, in the island of Jersey, by Charles Le Hardy, Esq. shows that they are considered there as an essential part of their crop; and that this saccharine root is particularly useful for fattening cows and hogs. It possesses many advantages which recommend its cultivation to the English farmer, particularly from its very nutritious quality and resistance of frost.

The Rev. James Hall, of Walthamstow, anxious to furnish a substitute for Hemp for naval purposes, and at the same time to provide employment for the poor, has proved, by a series of experiments, that fibres of very great strength, and applicable to the purposes of hemp, may be procured in large quantities from bean-stalks, collected and prepared after the beans are separated from the pods, and that the refuse part of the stalks, after the fibres are removed, form a nutritious food for cattle.

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When it is considered that any given quantity of tolerable land may be rendered valuable, or not, according to the nature of its product, attention becomes necessary to encourage that kind of Grass which yields the greatest crop and best nutriment for cattle; Mr. William Salisbury's communication on Grasses throws considerable light upon this subject.

Mr. John Saddington, of Finchley, has made some judicious experiments on the comparative merits of drum-headed Cabbage, Swedish Turnips, and Kohl Rabi, as food for cattle during the winter months; his opinion is in favour of the kohl rabi; and if we can form any certain judgment from the very great repute in which this vegetable is held in Germany, we are led to conclude, that sufficient attention has not been paid to its more extended cultivation in Great Britain.

The communication from Major Spencer Cochrane, of Muir House, on the benefit of Furze and its blossoms, conveys this useful lesson, that persons should be more minute than they usually are, in enquiries respecting the qualities of common plants, and it confirms the experiments heretofore made, that furze, properly prepared, will, in time of scarcity, and on several other occasions, form a useful food for cattle.

The information furnished by Mr. C. Waistell, of High Holborn, in our 26th Volume, on the value of growing

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Timber Trees at different and distant periods, has created so general an interest with the public, as to occasion its being reprinted in several periodical publications, and to continue in great demand. Mr. Waistell has, in the present volume, favoured the Society with some additional remarks upon the subject, and recommended measures, which, if adopted, would be of great national benefit.

Under the Class of Chemistry, it will be found that the efforts of the Society to bring forward to the public the different species of Marble, which the quarries of the united empire can furnish, has been successful; the beautiful varieties of marble which decorate the Great Room of the Society, produced by Mr. J. P. Hubbard, of Pickett-street, from the Babicomb quarry, in Devonshire, have attracted the public attention, and his example has been followed with specimens from Scotland and Ireland.

A new æra has lately taken place in Chemistry, and many interesting discoveries made in this science. Mr. H. Porret, Jun. has this session contributed his endeavours towards such improvements, and has made some curious experiments and observations on the constituent principles of the Prussic and Prussous Acids.

The Madder Roots of the Levant are universally acknowledged to yield brighter colours for dyeing Cotton Yarn

Yarn than the Madder procured from Holland. In order to ascertain whence the difference arose, John Spencer Smith, Esq. brother to Sir Sidney Smith, was requested to procure some Madder Seed from Turkey. He favoured the Society with some specimens thereof, and from these Mr. William Salisbury hath raised in Sloane-street a considerable number of plants, which appear to be more brilliant in colour, and to yield a larger quantity of Dye than that species of Rubia Tinctorum, which hath been cultivated usually in England, and supposed to be the same as the Dutch Madder.

Particulars of the Rewards bestowed under the Class of Polite Arts, will be found in page 20 of the present volume, and the performances, in general, did great credit to the young persons rewarded. A valuable Map of Shropshire, by Mr. Baugh, introduced to the public under the auspices and reward of the Society, has been strongly recommended by the nobility and gentry of that county, many of whose signatures to certificates appear in the volume.

An idea having for some time prevailed that the Silk-weavers of this country could not produce from their looms manufactures equal to the French, that public spirit which pervades the minds of every class of commercial men, and has contributed so largely to the prosperity of this country, excited

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excited the Spitalfields Weavers to undertake a work, hitherto unrivalled in the manufacturing world; some particulars of it are given in the present volume, and a reference may be had to the work itself now in the loom. A committee, deputed from these associated weavers, solicited and received the patronage of the Society.

A very ingenious Machine, for covering Wire with Silk or Thread, has been lately invented by Mr. William Sadington, which possesses the advantages of doing the business better, cheaper, and in a much smaller space of room.

Under the Class of Machines, it will be found that many useful inventions have been rewarded in the last session of the Society. The great pains which have been taken by John Miller, Esq. of Bedford, to rescue persons from drowning, and to recover such bodies as have sunk under water, do infinite credit to the head and heart of that worthy Magistrate; and his inventions appear to be more effectual for the purposes intended, than any hitherto laid before the public.

Mr. Thomas Newton, of Bridge-street, has invented an ingenious method of cutting Roots for Cattle, and articles for culinary purposes, which performs the business with ease and expedition.

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Naval improvements have, for several years past, formed a considerable part of the Society's Transactions, and will doubtless ever be thought highly deserving of the Society's consideration. Captain Bolton's Jury-masts for ships were mentioned in our last volume, and the Society have since received from him, not only particular accounts of the manner in which such Jury-masts should be rigged, but also some observations deserving attention, respecting a new and cheaper mode of rigging Ships in general, and securing the Shrouds.

The difficulty of procuring wooden Knees of natural forms, for securing the beams of ships, hath called forth the exertions of many excellent mechanics. Amidst several substitutes proposed to answer this purpose, the invention of Mr. George Williams, of the Dock-Yard, Chatham, hath been thought by the Society to hold a distinguished rank.

On considering the immense number of Carriages employed for the conveyance of persons or passengers in every part of the kingdom, and the numerous accidents frequently arising from the Linch-pins of carriages breaking or flying out, the safe and simple contrivance by which Mr. J. Varty, of Liverpool, hath obviated this evil, will probably meet with universal approbation. His Linch-pin can be adapted to carriages of every construction, and a mere inspection of

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the engraving will decidedly prove its utility, and recommend it for general use.

It may be remarked as a singular circumstance, that the rapid improvements which have carried our Cotton Manufactories to such a degree of excellence, as amongst the dangers of war to force a market in every part of the world, have taken place since the establishment of this Society: The first idea of spinning more threads than one at the same time, originated from and was rewarded by it. The same observation applies to the ingenious art of weaving Marseilles quilting, to the beautiful needle-work of Miss Linwood, and to an infinite variety of other cases. The machine for hackling Hemp and Flax, the invention of Mr. Matthew Murray, of Leeds, noticed in the present volume, bids fair to be the ground work of great improvements in the linen manufactories, as it can perform the work in a superior manner, and at a cheaper rate than by the hand.

The advantages of speedy communication, on many occasions, are too well known to require any comment. The Anthropo Telegraph, invented by Mr. Knight Spencer, gives very great facility for such communications either by day or night, and the whole apparatus may be made at very little expense.

The simple and ingenious contrivance of that gallant officer, Lieut. Spratt, R. N. by which the whole combination of figures can be carried to any extent, merely by different positions of a handkerchief, appears to have simplified communication by signals beyond any thing that could have been expected. The Homographic Signals are learned in a few seconds, and every thing essential for it may be contained in a common coat-pocket.

There are few persons who have not found the necessity of preserving and of referring to many receipts and other papers, and experienced the great trouble of taking off and replacing such papers occasionally when filed. Mr. White, of Essex-street, has invented a Letter-file upon such a principle, that the whole process above-mentioned may be speedily and easily effected, and every paper preserved in its proper place.

Mr. Thomas Warren's Engraved Slates, furnish facilities for learning to write in a very complete and easy manner; their use will considerably abridge the expenses of this branch of education, and the letters and figures to be copied are formed in a superior style to the hand-writing of many masters.

Slate-pencils have usually been imported from Holland,
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and considerable sums of money remitted from England for their purchase; Mr. J. Brockbank's ingenious Machines for making this article in a superior mode to the foreign, will probably so far reduce their price, as to insure them a demand even upon the Continent.

Every person, particularly if resident in the country, must have experienced the vexation arising from petty depredations upon his property, and many unpleasant suspicions have arisen respecting the offender, without knowing who he really is. Mr. Robert Salmon, of Woburn, has invented an ingenious instrument for detaining and exposing the depredator, without doing him any serious bodily injury; it is effectual, and easily placed without being suspected.

The present mode of building Cottages is so expensive, and the difficulty of procuring the usual materials for the purpose so great, that the poorer classes frequently suffer greatly from the inclemencies of the weather, in the wretched hovels which they inhabit. In many parts of the Continent, very comfortable habitations have been made of beaten earth, called Pisè Buildings, and attempts for constructing such in England have, at different times, been unsuccessfully made. Mr. Robert Salmon, of Woburn, with that nice discrimination and skilful execution which characterize all his undertakings, has not only completed several buildings upon

upon this plan, but improved considerably the machinery necessary for such buildings, and given a full detail of the means of doing the business effectually, so as to possess many advantages over stone or brick buildings.

From the alarming accidents resulting from the fires which frequently occur amongst tallow-chandlers, and other manufacturers of inflammable matters, the Society have thought it expedient to publish an account of an ingenious model of a Boiler, with a double rim and channel, by which inflammable matters may, on boiling over, be conducted without danger to a vessel appointed to receive them. The model was presented to them by Mr. Bream, of Yarmouth, and they have no doubt but that much mischief might be prevented by the use of boilers on such a construction.

The clock and watch-making business is very extensive, and great improvements have arisen in mechanics from persons originally in this employ; emulation in this line is constantly producing something new, and the simple and ingenious Clock Escapement of Mr. George Prior, Jun. will be found to have considerable merit.

There is scarcely any person who, at one period of life or another, hath not suffered acute pain from some extraneous matter, as a fly, dust, &c. getting into the eye, and found some difficulty in obtaining relief; the Eye Bath, invented by

Mr.

Mr. J. Ducket Ross, removes such impediments with ease, and weak eys are much strengthened by its use.

From Mr. Gilbert Gilpin's communication, we learn that the superior advantages arising from the use of Iron Chains upon his plan over hempen ropes, both in action, safety, and price, are daily confirmed by experience.

The miseries endured by those unhappy beings, the Climbing-boys, or infant Chimney-sweepers, hath not only interested the humanity of the inhabitants of this great metropolis, but called forth the attention of many other persons throughout the kingdom. Much praise is due to the Committee established at Sheffield, for the pains they have taken to remedy this evil, and their communication upon the subject not only deserves the attention of individuals, but points out to the Legislature some effectual means for abolishing a practice long the peculiar disgrace of this island.

Under the Class of Colonies and Trade much interesting information is opened to the public.

The encouragement of the culture of Hemp in Canada is still attended to with a vigilant eye by the Society; and the information given by Mr. Charles F. Grece points out how some difficulties which have intervened, respecting the procuring of good seed, may be prevented in future. The
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Society lamented that, owing to some irregularity in the claim, they could not, consistent with their rules and orders, give him their Gold Medal; but they conferred upon him their Silver Medal, set in a broad Gold Border, as an honor nearly equal.

The indefatigable attentions of Dr. Alexander Anderson, of St. Vincent, procure to the Royal Botanic Garden, there established, some valuable product every year, diffusing benefits not only to that quarter of the world, but pointing out various articles to Great Britain, likely to be serviceable to her Commerce and Manufactures. The Society have heard with great pleasure, that Government have engaged to make some provision for this worthy and active subject, in case age or infirmity should prevent the continuance of his wonted labours.

The natural products of the East Indies afford an unbounded prospect for unremitting investigation; Mr. J. Mac-lachlan has furnished from thence some useful hints in Manufactures and Medicine; but the indefatigable exertions of Dr. William Roxburgh, of Calcutta, to extend human knowledge upon almost every subject connected with the views of this Society, demand universal applause. His observations on the articles he hath lately sent to the Society, the instructions he has given in preserving plants, seeds,

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and roots, during long voyages, and the interesting communications he hath procured from Dr. B. Heyne, respecting the Soda or Marine Alkali, of which our colonies in India could furnish the whole demand of the united empire, together with the curious account of the Diamond mines of Malavilly, will furnish a large field of investigation to the amateurs of Mineralogy, Chemistry, and Natural History.

We trust that the public will be much gratified with the great variety of articles which the present volume contains, and the numerous explanatory Engravings executed by that eminent artist, Mr. Porter, in a manner which does him much credit.

The present session of the Society commenced the first Wednesday in November, and a variety of new inventions and improvements have been already submitted to their consideration; the Society are ever ready to pay attention to every object connected with the nature of their Institution.

The Society express their thanks to the several public bodies and individuals, from whom they have received sundry presents, noted in page 265 of the present volume; and are particularly obliged to Alexander Mitchell, Esq. for many valuable additions to their library, and other spirited exertions to promote their interest.

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The Society desire it to be clearly understood, that, as a body, they are not responsible for any opinion or representation of facts contained in the following pages. They have endeavoured only to compress, into a form more concise, such communications as appeared to them too diffuse when received.

The accession of new Members to the Society is annually very considerable ; their Weekly Meetings and Committees are well attended ; and their Finances are in a very flourishing state.

The great advantages to be enjoyed by the Members for acquiring and diffusing useful knowledge, originally united their predecessors in one common bond of interest for the public good ; and there is no doubt but that great benefit will continue to accrue to the united empire by the exertions of their successors.

Adelphi, London,
Dec. 30, 1809.